Large ductwork under the roof, which is painted black, captures heat that's used to dry bales.

Solar Heat Used To Dry Wet Bales

Nathan Weaver can bale hay wet and dry it later using his solar-heated, "active air" dryer. He and his son can dry 72 big high-moisture bales at a time in a 48 by 90-ft. area in his barn.

Weaver got his hay drier idea from a past article in Graze magazine (www.grazeonline.com; ph 608 455-3311) about a system in France for drying loose hay. This past spring, he described developing the bale dryer in a detailed, 5-part series in Graze magazine. Weaver and the editor of Graze agreed to share an overview of the process with FARM SHOW.

"I love dry hay, but can't count on it because of our climate," says Weaver. "To capture winter feed at optimum quality, we often have no choice but to harvest the crop as baleage or silage."

Weaver built his 72-bale unit in 2020 after experiments in 2019 with a 3-bale prototype. The basic concept is collecting solar energy and blowing heated air up through the bales.

"We've learned that bales being dried should be of a uniform density without an overly dense outer layer," says Weaver. "With the exception of 2 dense bales, we were impressed with the results. The hay was of good color and sweet smell. Cows preferred it to similar quality baleage fed alongside."

For the large scale 2020 experiment, Weaver cleared out the bedding in the barn and prepped the area with a layer of wood chips for a smooth work surface.

He situated a blower near the center of the barn's west wall. It feeds hot air from under the roof out to 8-ft. wide air ducts that run across the floor. Tongue and groove, 3/4-in. flooring underlayment was used to make the bale-drying ductwork that runs around the perimeter of the barn. The design allowed bales to be placed on the drying ducts by a skid steer.

The Weavers cut 20 and 32-in. diameter holes spaced 5 ft. on center in 2 parallel lines all along the platforms.

Solar energy is captured from under the barn's steel roof. It's then pulled down and forced up through the bales. Weaver built an 8-in. ductwork beneath the 4,500 sq. ft. roof using 1-in. thick foam board insulation. He painted the galvanized roof black to maximize heat capture. Weaver used a 35-hp. diesel engine to power the blower. It can move up to 1,500 ft. of air per minute.

"The first test came in June when we placed 68 bales, estimated at 40 percent moisture, on the drying ducts," he says. "We ran the blower for a few hours to cool the bales down and then ran it during the daylight hours and shut it down at night," says Weaver.

After several rounds of drying bales and a few problems, Weaver emphasizes the need for adequate air to all bales. His rule of thumb became about 1 hr. of dryer time in good drying conditions per percent of moisture in the bale.

Over the course of the summer, he dried 256 bales, about 60 percent of the total bales made. Initially, he turned bales upside down when they were close to being dried. This was a mistake as it caused more spoilage in the wetter area.

Bales rest on an elevated wood platform with holes in it. Hot air from the roof blows up through the bales.

Weaver reported better feed utilization with less refusal by the cows, as well as better manure consistency, suggesting better feed digestion. He is experimenting with hay preservatives that may allow him to remove bales from the dryer at a higher moisture level and retain higher nutrient levels.

Weaver sees only 2 negatives so far. One is the noise of the engine and blower. The other is having to babysit the bales.

He estimates total material cost of about $11,000 for what he suspects could be a 20-year life. He estimates 1/2-gal. of diesel fuel to dry each bale.

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Water Heater Makes Great Crop Roller

Jeff Hoard pulls his water heater roller behind his homemade tractor. He uses it to help with planting camelina.

Dryland camelina can be tough to grow, but rolling the broadcast seed helps. Jeff Hoard rolls his with a repurposed water heater tank.

"I grow dryland camelina for a high protein hay," says Hoard. "However, even with shallow tillage, drilled camelina can have trouble breaking through the crust that forms on my soils. If I broadcast it and roll it, I get better emergence."

Hoard saw no reason to buy a roller for his small acreage of camelina when an old water heater tank could do the job. The 4-ft. tall tank with a flue running up the center was a natural fit for an axle. Should he need more weight, he could simply fill it with water.

"It was a simple fabrication, requiring only the axle and a hitch," says Hoard. "I used 2 large washers that fit the diameter of the flue and matched an axle to the hole in the washer. I welded a couple pieces of pipe together for a hitch."

A short piece of pvc pipe serves as a bushing around the axle, and holes through the pipe and the pvc allow for lubrication when needed. The remainder of the hitch is also salvaged pipe. The hitch tongue can be hooked to Hoard's small, homemade tractor or to an ATV, depending on the size of the area to be rolled.

"It can also accept a handle if I want to press a small area by hand," adds Hoard. "The 4-ft. width of the roller makes for good contact with the soil as it doesn't hit many high points. Surprisingly, I can cover a lot of ground in a short time."

Hoard describes himself as a creative scrounger with a decent scrap pile and credits FARM SHOW for much of his inspiration. "It's my favorite publication," he says. "Like a lot of my projects (16 described in previous FARM SHOW issues), the roller cost me nothing except for some welding rod."

Large washers were used for the diameter of the flue. The axle matches the hole in the washers, and a short piece of pvc acts as a bushing for the roller.

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Golf Cart Fitted With Diesel Engine

Anthony Finkbeiner has a pit vehicle that turns heads almost as much as his trophy-winning 2000 Chevy 3500 pulling truck. That's because Finkbeiner's powder blue 1992 Club Car golf cart is powered by a diesel engine from a 1989 Kubota lawn tractor.

Over 3 mos. Finkbeiner and his father installed the 25 cu. in. 2-cyl. engine in the cart and modified the drive system to work with the cart's transaxle. The install required a 2-in. lift on the rear of the car, which Finkbeiner says gives the rig a nice rake.

He boosted engine performance by adding a Schwitzer turbocharger taken from a small industrial loader. The turbo pulls air through a K&N air filter assembly normally used on a motorcycle. Exhaust is taken out through a 2 3/4-in. axle dump that he fabricated himself. The little diesel delivers about 10 hp. through a turned-up fuel injection pump.

Finkbeiner painted his cart Ford/New Holland blue to match his pulling truck, which he uses to compete in the NTPA 3.0 Limited Pro Stock Class. Adding to the cart's look are 8-in. polished Douglas Racing wheels with Kenda 18 by 9.50-8 Pathfinder tires.

Contact: FARM SHOW Followup, Anthony Finkbeiner, Adrian, Mich.

Finkbeiner and his father installed the 25 cu. in. 2-cyl. diesel engine in the cart and modified the drive system to work with the cart's transaxle.